cases, but two years later one may have a return of menorrhagia while the other may go on to early menopause. Certain facts are helpful in the management of these cases: Organotherapy occasionally makes radium unnecessary. If radium is used an amount in excess of 1000 mc. may induce the menopause especially in women over thirty-eight years. Increased flow after treatment suggests a possible menopause as does also an increase in blood-pressure. From the standpoint of ultimate results it is preferable to give repeated small doses, *e. g.*, 300 mc., at intervals not more frequent than once in three months, without control observation of blood-pressure and subjective symptoms.

PATHOLOGY AND BACTERIOLOGY

UNDER THE CHARGE OF
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Hemolytic Streptococci in the Throat in Certain Acute Infectious Diseases.—OTTERAAEN (*Jour. Infect. Dis.*, 1920, xxvi, 23) examined the mouths, noses and throats of three hundred patients, most of whom had either diphtheria or scarlet fever, to determine the prevalence of hemolytic streptococci. Surface inoculation of goat's blood-agar plates was employed, although a higher percentage of positive findings was encountered when the enrichment method was used. While all organisms produced complete hemolysis the surface colonies varied considerably as to size and intensity of hemolysis. According to Holman's classification most of the fifty strains tested were either S. pyogenes or anginosus. Animal inoculations and phagocytosis experiments indicated that the organisms isolated were not virulent. Of the 300 cases, 46.6 per cent. showed hemolytic streptococci on admission and some became positive after entrance, making a total of 60 per cent. In the patients with diphtheria, positive cultures were obtained in 10 per cent. from the nose and 4.6 per cent. from the mouth, whereas in the scarlet fever cases the nose cultures were positive in 20.8 per cent. and the mouth in 12.8 per cent. Only a small number of patients yielded positive cultures from all three sources, the mouth, nose and throat. Those with positive nasal cultures, as a rule, had negative throat findings, and *vice versa*. When hemolytic streptococci were present in the nose, they were often predominating, while in the mouth they were usually found in small numbers. Negative cases which later became positive frequently did so after being in contact with carriers.

The Fate of Streptococcus Hemolyticus in the Gastro-intestinal Canal.—Pathogenic streptococci, especially hemolytic streptococci, gain access to the gastro-intestinal canal from the throat and tonsils where they have been shown to occur in normal individuals as well as by the ingestion of certain foods, particularly infected milk. While the strong

bactericidal effect of gastric contents on bacteria in the stomach is recognized and while hemolytic streptococci occur in normal feces in relatively few instances, little is known of the specific action of the intestinal juice on the Streptococcus hemolyticus. In an effort to ascertain the action and fate of hemolytic streptococci in the alimentary canal, DAVIS (*Jour. Infect. Dis.*, 1920, xxvi, 171) introduced into the stomachs of three rabbits, by means of a catheter, 10 to 20 c.c. of one avirulent and two virulent strains of these organisms. Each type of organism was fed for ten days to each of the animals, during which time daily examinations of the feces were made. It was found that hemolytic streptococci did not occur normally in any appreciable number in the gastro-intestinal canal of rabbits. When introduced into the stomach of rabbits these bacteria may occasionally pass through the canal and appear in the feces. At the end of thirty-one days the animals were sacrificed and examination of the gastro-intestinal canal at various levels indicated that the hemolytic streptococci did not develop to any great extent in the intestines, not did they readily gain a permanent foothold there. From additional investigations it was observed that rabbits with generalized streptococcus infections in joints and blood showed none of these hemolytic streptococci in the intestinal contents; that the gastric juice of normal acidity from man and rabbits killed hemolytic streptococci in from two to five minutes, while gastric juice in achylia may not kill them in several hours; that hemolytic streptococci were not found in the normal human feces of 53 cases and that hemolytic streptococci, when mixed with normal human feces lived in the icebox for several days, whereas in the incubator they tended to die out rapidly.

Relation of the Portal Blood to Liver Maintenance.—ROUS and LARIMORE (*Jour. Exper. Med.*, 1920, xxxi, 609) carried out a series of observations upon the liver following upon the partial occlusion of the portal vein. Rabbits were used in the experiments. They found that it was quite easy to completely shut off a large part of the portal circulation, leaving, however, a sufficient distribution to the right posterior and caudate lobes to maintain adequate liver function. As soon as the one branch of the portal vein is ligated the involved lobes become smaller and dark in color. In the meantime the mass of portal blood is diverted to the remaining branch and the lobes supplied by it become swollen and of brighter color. Hypertrophy of the latter lobes begins within three days and by the end of twelve days has more than doubled in size. Subsequently it slowly increases and eventually reaches the size of the entire original liver. A process of atrophy continues in the ligated portion, the lobe gradually dwindling to a shrunken fibrous mass. The connective tissues of the stroma do not show response either of the nature of replacement fibrosis or of inflammation. By these experiments three-fourths of the liver may be reduced to a fibrous tag within two months. The bile which is secreted from the liver mass advancing in atrophy is almost colorless and deficient in bile salts. The authors suggest that the results of the experiment should aid in an understanding of certain chronic liver lesions. It is indicated that the portal blood bears a relation to the liver not only for its functional capacity but also more directly for its vital support.

The Mycelial and Other Microörganisms Associated with Human Actinomycosis.—COLEBROOK (*British Jour. Exper. Path.*, 1920, i, 197) gives a series of 27 cases of actinomycosis, 17 in the years 1911–14 and the remainder since the war period. These were all true types of Actinomyces bovis, all showing suppurative lesions with visible granules in the pus and 25 per cent. of these showing clubs at the periphery of the granules. For purposes both of diagnosis and culture, actual granules were obtained from the pus. He first deals with the mycelial organisms isolated and later with the associated bacteria. He classifies the first into groups *A*, *B* and *C*. Twenty-one strains came in group *A*. These strains were filamentous organisms, being slender branching and seldom straight for more than 20 or 30 microns. They were Gram-positive but not acid-fast and showed a strong preference for anaërobic growth. Cultures were obtained on ordinary nutrient agar or broth but grew better with 1 per cent. glucose. Their viability was slight (60° C. for one hour killing the cultures). He identified this strain with the Actinomyces bovis of Wolff and Israel. Group *B* included two strains. They were similar to *A* in their preference for anaërobiosis, slight viability and morphologic features. However, they grew poorly on glucose agar and no aërobic cultures were obtained. Group *C* included one strain. The mycelium was perhaps straighter but otherwise similar to *A*. Cultures gave a single aërobic colony. Subculture on glucose agar gave several large flat rosettes which grew deeply into the media. The three remaining cases were not sufficiently worked out to be grouped. The author opposed the idea that the ray fungus was derived from grasses and vegetation, inasmuch as it is an anaërobe. He is more inclined to believe that it is a frequent inhabitant of the alimentary tract and from there is carried into the tissues. Coarse agglutination with the serum of heavily infected persons occurs up to 1 in 500 to 4000 dilutions. Similar results were obtained in sera of rabbits inoculated with a vaccine of Actinomyces bovis. In 30 cases, the granules of which were examined, 24 showed an associated organism having the following characters: coccoid forms or bacilli; no capsules; non-motile; Gram-negative; star-like colonies that adhered to the tube in fluid cultures; grew aërobically or anaërobically; viability slight (52° C. for half-hour kills); pathogenicity for man was not determined but for animals doses 300 to 15,000 millions produced death. He identified this organism with the *B. actinomycetum comitans* described by Klinger while working in Zurich. The author advanced four hypotheses trying to solve the reason for the presence of these organisms in over 80 per cent. of his cases. None of these, however, seemed satisfactory to himself. Other organisms, such as streptococcus and staphylococcus, may be found in the cervicofacial and abdominal cases of actinomycosis.

The Pathological Histology of Tonsils Containing Hemolytic Streptococci.—KELLERT (*Jour. Med. Res.*, 1920, xli, 387) disparages the growing tendency to attribute the source of systemic infections to the tonsils, stating that, though these organs may often harbor pathogenic bacteria, it is by no means a corollary that these lymphoid masses are therefore the initiators of the general disease. He further notes that an abrasion must be present on the mucous surface of the tonsil to provide a portal of entry for the infecting material, and yet many

ulcerated tonsils have been removed from adults who have previously manifested no distant affections. It is noteworthy, also, that the investigator through his own work and that of others, notably, Smith and Brown, Smillie, Nichols and Bryan, and Tongs, has been led to conclude that streptococci carriers are as definite and menacing an entity as are those of typhoid, dysentery and diphtheria and to this list must also be added meningococci and pneumococci carriers. The work in the various army cantonments with epidemics of hemolytic streptococci infections strengthens this conclusion. The author examined the material bacteriologically only for hemolytic streptococci. Seventy pairs of tonsils were cultured and examined microscopically. Cultures were made from both the mouths and from the depths of the crypts near the capsules. It is of significance to note that the greatest numbers of hemolytic streptococci were grown from the cultures taken in the depths of the tonsils. The figures for the frequency of finding hemolytic streptococci in these seventy instances are not presented. Grossly, the tonsils varied considerably in size and shape and all those showing hemolytic streptococci presented a more or less constant microscopical picture. No abscesses were encountered. The capsules were generally thickened with the branching trabeculæ showing a correspondingly denser structure. Old blood pigment, muscle and mononuclear cells were seen in the fibrous capsule. The writer feels that no analogy can be safely drawn between the chronicity of infection and the density of the capsule. Ulcerations of the mucous surfaces of the crypts with a penetrating infiltration of polymorphonuclear leukocytes and mononuclear cells were observed. Bacteria were present to a greater or less degree in all the crypts. The lymphoid follicles were hyperplastic and less definite in outline than normally. Cartilage was found in the capsule of 10 per cent. of those positive for hemolytic streptococci, and in 25 per cent. of those not showing this organism. The investigator's views are summarized in a terse manner wherein he observes that infected and diseased tonsils are not infrequent in healthy adults and that the largest tonsils are not necessarily the most severely infected. Inflammatory changes indicative of infection may be found in nearly all tonsils. The conclusion is drawn that hemolytic streptococci may be saprophytic in the tonsil and that no distinctive pathologic lesion can be assigned to this organism in the tonsil.

Observations on Changes in Virulence of Hemolytic Streptococci with Special Reference to Immune Reactions.—Nakayama (*Jour. Infect. Dis.*, 1920, xxvii, 270) observed the changes in virulence of hemolytic streptococci produced by animal passage, growth in artificial culture and certain other conditions, at the same time noting the reactions with immune serums of streptococcal strains of varying degrees of virulence. It was found that the virulence of a streptococcus rapidly decreased on artificial cultivation, particularly on blood agar. The amount of peptone in the medium apparently did not influence the virulence so much as the reaction, acid reaction maintaining virulence better than alkaline. The virulence persisted longer under anaërobic than aërobic conditions. An avirulent streptococcus increased in virulence for both rabbits and mice on passage through the rabbit. When also passed through mice, the virulence was further increased, particularly for mice and when a certain maximum of virulence had been reached no further increase

developed on further passage through the mice. When the maximum virulence for mice had been established passage through rabbits sometimes increased virulence for rabbits but decreased for mice. On the other hand, if virulence for mice was still increasing, passage through rabbits could increase the virulence for both rabbits and mice. By keeping streptococci in a collodion sac in the rabbit peritoneal cavity, it was found that virulence may be increased. In the agglutination reactions, cinnabar was employed to obviate the action of minor agglutinin and to prevent spontaneous agglutination of the streptococci. It was learned that the agglutinability of a streptococcus may change as the result of animal passage, the particular strain used for immunization being agglutinated more strongly than the related strains by the corresponding immune serum. The original non-virulent strain of streptococcus was agglutinated by all the immune sera. The same relation seemed to obtain with reference to opsonins and phagocytosis, as well as with respect to specific precipitation and conglutination, but no difference between the different strains by means of complement fixation could be made out. All the various strains were agglutinated in the same way by acid solution.

Noma in the Dog.—Fusiform bacilli and spirilla are so universally found in the morbid tissues of noma, Vincent's angina and other phagedenic processes that, in light of our present knowledge, most writers believe that we are justified in considering them as the possible if not the probable causative agents in these processes. PHILLIPS and BERRY (*Jour. Infect. Dis.*, 1920, xxvii, 136) report typical noma in a dog, a cocker spaniel, which developed after a mild attack of distemper. The lesion began on the right lower lip and extended to the ramus of the jaw and tissues of the neck. Prostration ensued after eight days, death occurring on the thirteenth day, when the moribund animal was killed after pneumonia developed. Daily smears from the lesions, stained by dilute carbol-fuchsin, showed that B. fusiformis and spirilla greatly predominated over a small number of micrococci and short bacilli. In the later stages of the disease, the fusiform bacilli tended to form involution forms which frequently resembled thick spirilla. Attempts to culture the organisms anaërobically on glucose horse serum agar were unsuccessful. Smears from the gums of normal dogs showed only a few fusiform bacilli and spirilla. The authors suggest that dogs be used in experimental noma and call attention to the possibility of contagion from dogs to man.

Studies in Epidemic (Lethargic) Encephalitis; Cultural Studies.—In previous communications, Strauss, Hirschfeld and Loewe have reported the findings of a filtrable virus in cases of epidemic encephalitis. Later, a filtrable organism obtained from the virus by special cultural methods, was described. LOEWE and STRAUSS (*Jour. Infect. Dis.*, 1920, xxvii, 250) have reviewed the previous work, supplementing additional studies. The organisms appeared to thrive best when the original Noguchi technic was followed, employing sterile kidney fragments and ascites fluid medium. The optimum solid medium was gelatinous in character, consisting of nutrient agar, ascitic fluid and kidney tissue. Cultures made on ordinary media and by Rosenow's technic have proved negative. A minute filtrable organism has been cultivated from

the brain, nasopharyngeal mucous membrane, nasopharyngeal washings, spinal fluid and blood of epidemic encephalitis cases, while control cultures of material from human patients suffering from or dead of conditions other than epidemic encephalitis were found to be uniformly negative. Under dark field illumination, the organisms were minute, globular, refractile, non-motile forms, occurring singly in diploform chains and clumps, the latter form predominating. Young cultures on fluid media were Gram-positive, while the older ones and those on solid media appeared to be Gram-negative. Tinctorially, the organism was of a basophilic nature. The same organism has been recovered from the brain and nasopharyngeal mucous membrane of animals which were inoculated with virus or culture and which succumbed to the experimental disease. The cultures thus recovered have produced the disease when injected into other animals and the organism has again been recovered. Positive animal inoculations have been obtained with the eleventh generation of this organism. Berkefeld and Mandler filtrates of brain material, nasopharyngeal mucous membrane and washings, spinal fluid and blood from cases of epidemic encephalitis have produced in rabbits and monkeys lesions typical of the disease. The virus has been passed through many series of animals and can be preserved for months in 50 per cent. glycerol. The authors suggest that their results indicate that epidemic encephalitis can be differentiated from epidemic poliomyelitis since rabbits are susceptible to the infectious material of the former and not to the latter, and monkeys are very susceptible to poliomyelitis and relatively refractory to epidemic encephalitis. Again, spinal fluid from poliomyelitis is innocuous to rabbits and monkeys, whereas spinal fluid from cases of epidemic encephalitis produces lesions typical of the disease in both these animals.

A Study of Streptococci Obtained from the Mouth in Cases of Chorea.—The triad of articular rheumatism, endocarditis and chorea and their frequent association with streptococcic tonsillitis have furnished problems for repeated investigation, and further since the streptococcus has been shown to be the organism most commonly isolated in the group, lends added interest to the study of the streptococci found in the mouths of chorea patients. Floyd (*Jour. Med. Res.*, 1920, xli, 467) details his findings in the study of the streptococci obtained from the mouths of 26 individuals clinically manifesting chorea. Previously Mayer and Cole were able to produce acute arthritis and endocarditis in animals by the intravenous injection of streptococci obtained from various sources but only Beattie reports symptoms suggestive of chorea following the intravenous injection of streptococci and these were not typical. Westphal, Wassermann and Malkoff, Apert, Richter and Poynton and Paine isolated a diplococcus from cases of chorea and the latter were able with their diplococcus to produce choreiform twitchings, arthritis and endocarditis in rabbits, The author is impressed by the infrequent positive findings from blood cultures in definite cases. In the present instance cultures were taken from about the teeth and from the crypts of tonsils in 26 cases of acute chorea and planted upon Loeffler's blood serum or blood agar. The streptococcus was readily isolated from all but 3 cases. Blood cultures were negative as were the cultures of cerebrospinal fluid. Pure cultures of the streptococci were introduced into the peritoneum of mice and if fatal to the animal within twelve to twenty

four hours, subcultures were taken from heart's blood and joints and rabbits were inoculated intravenously. From 1 to 6 inoculations were required to produce fatal results in different animals and when death ensued immediate autopsy was performed and subcultures of organisms obtained from definite lesions were perpetuated for possible later therapeutic use. In 4 cases definite vegetative endocarditis was developed in the rabbit and the infective organism in three of these was from tonsil while the fourth was from teeth. Eight animals manifested acute swelling of joints with definite crippling. The brain of the animals showed only engorgement of the pial vessels. Ten children with healthy throats were cultured as control cases and from only three of these were streptococci grown and not one of these was pathogenic for the mouse. An attempt was made to determine some method for therapeutic usage of the virulent organisms. However, in all attempts the results proved negligible. The author was able to prove satisfactorily that members of the streptococcus group may be isolated from the pathological lesions in endocarditis, articular rheumatism and chorea. He found also that the percentage of virulent streptococci about the teeth and in tonsils of chorea patients is much higher than in normal throats.

HYGIENE AND PUBLIC HEALTH

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Possibilities of Using Mosquito Traps in Antimalaria Work.—METZ (*Public Health Reports*, 1920, xxxv, 1974) states that the control of malaria is rapidly becoming a rural problem as the expensive mode of eradication applicable to urban communities cannot be applied to country districts under present economic conditions. The writer noted that Anopheles were attracted by pigs and a pen was devised which served as a trap, allowing the mosquito to enter but not to emerge. It is suggested that a chemical agent might take the place of the pig and that the whole subject is worth full study.

Necessity of Low Temperatures for the Preservation of Vaccine Virus.—The Public Health Service (*Public Health Reports*, 1920, xxxv, 1762) publishes a warning against keeping vaccine virus under unfavorable temperature conditions. It is pointed out that the virus should be kept in contact with ice during the summer period and at a low temperature at all times. Special refrigerating devices are recom-